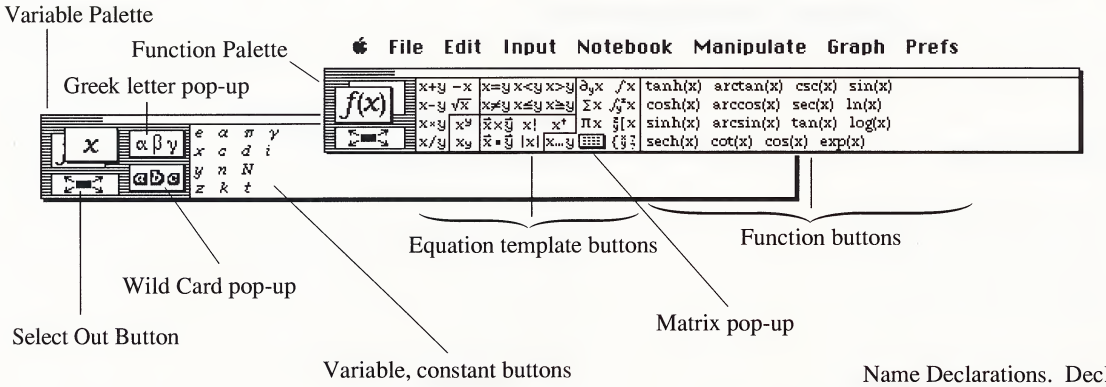
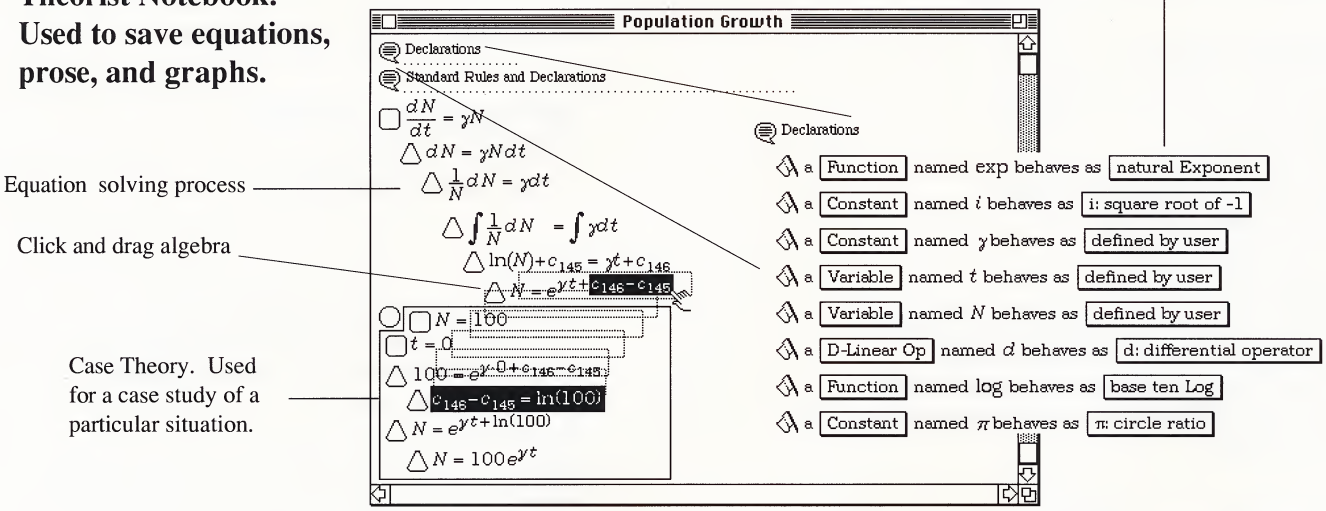
Theorist's Intuitive Interface

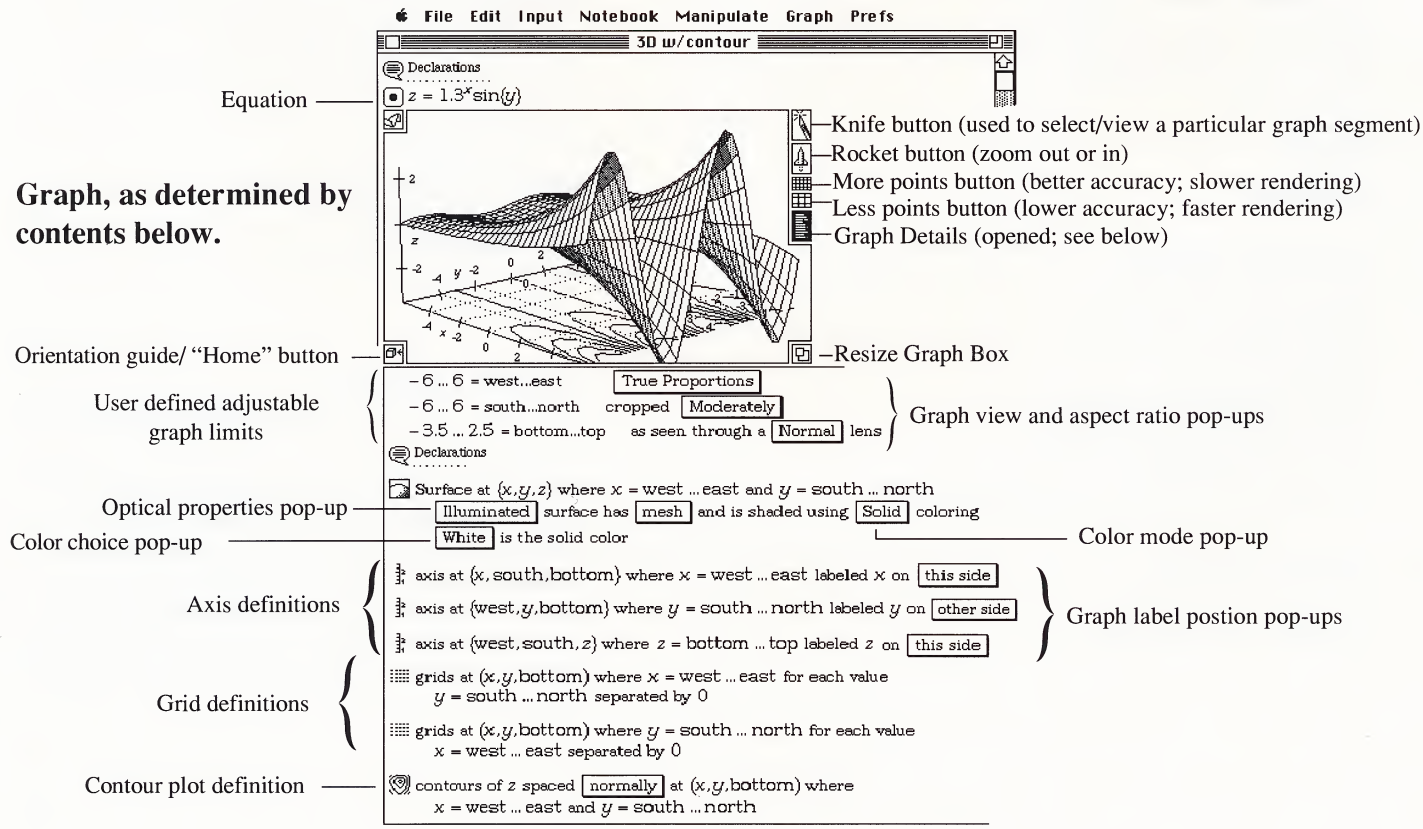


Double sided point and click equation palette. Used to construct WYSIWYG equations.

Name Declarations. Declares specific fuctions, constants, variables, linear operators, etc. Hidden underneath icon for easier Notebook management.

Theorist Notebook. Used to save equations, prose, and graphs.





Mathematical Features

(Symbolic and Numerical)

User Interface

Scientific notation looks real i.e.1.2×10^6
WYSIWIG equations
Names can contain Greek letters and other symbols
No reserved names, all names user-configurable
Parentheses automatically alternate between ( ) [ ] { }
Large expressions collapsable for easier viewing
Built-in outliner
Copy and Paste equations to and from Expressionist
Copy and Paste equations to and from programming languages
Point-and-Click equation manipulation

Symbolic Algebra

Polynomial expansion and factoring
Integer factoring
Polynomial division
Collect over common denominator
Partial fraction expansion
Solve for single variable
Commute terms or factors
Absolute value, Powers, Square roots, Factorial
User configurable pattern matching rules
Click-and-Drag manipulations for quick results
Apply manipulations to any subexpression that you can click and select

Symbolic Matrix Algebra

Matrices can contain any expressions
Addition and Multiplication
Integer Powers
Inverses
Adjoint
Determinant

Symbolic Calculus

Partial and total derivative
Differential operator algebra
Laplace Transforms
Iterated summation, product
Definite and Indefinite Integrals
Integral Table supplied
Enough tools to integrate everything in the CRC

Vector Calculus

Dot and Cross Products
Grad, div, curl, Laplacian

Transcendental Functions

Natural and Common Log *
Log to arbitrary base *
Power *
$\Gamma(x)$ *, incomplete Gamma, Beta
erf(x), erfc(x)
Bessel J_n, Y_n, I_n, K_n, H_n
Spherical Bessel j_n, y_n, i_n, k_n, h_n *
Orthogonal polynomials *
$\zeta(x)$
Spherical Harmonics *

* = defined over entire complex plane

Approximation Methods

Taylor series solutions
19-digit numerical root finder

Numeric

Calculate expressions for numeric results
Reduce expressions to simplest numerical form
Graphics calculated through numeric pipline
∞, $-\infty$, unknown value
Integer, real, complex matrices
Matrix calculation: inverses, determinants, powers
Numeric Calculus: derivatives, definite integrals
User defined constants, variables and functions
All results to 19 digits of precision
All operations and most functions defined over complex plane

Graph Types

Linear, Logarithmic, Parametric
3D color, illuminated
Polar, Spherical, Cylindrical
Contour, Density
Complex 3D

Graphic Primitives

Curve, Axis, Surface, Contour surface, Grid line set

All primitives defined over a parametrically defined curve or surface of almost unlimited complexity. Coordinates may be mapped through matrices or arbitrary nonlinear transformations using numeric pipelines. Surface colors are defined functionally using one of fifteen different mapping interpretations. Surfaces may be transparent, translucent, opaque, or illuminated.

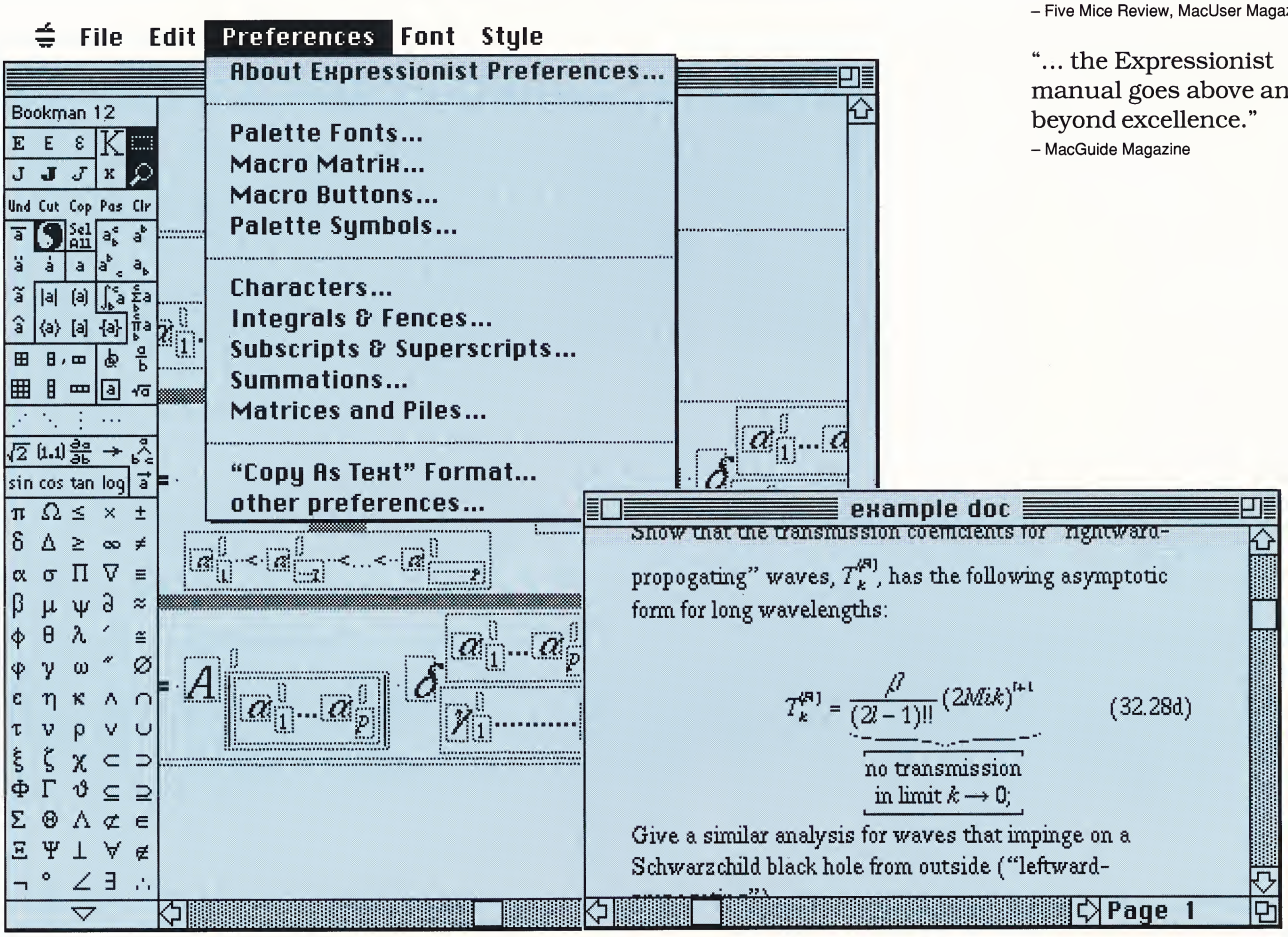
Expressionist™

The personal mathematical equation editor for typeset quality equations in your word processing, page layout, and presentation documents.

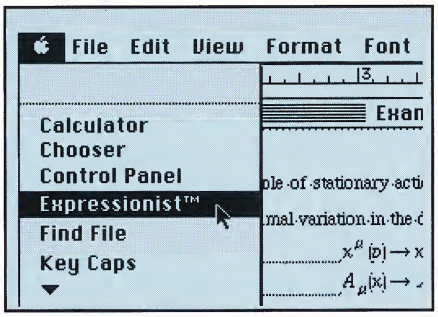
"An excellent toolkit that all technical people should have at their disposal."
– Jean Louis Gassée,
President, Apple Products
Apple Computer, Inc.

"Equation manipulation has never been easier."
– Five Mice Review, MacUser Magazine

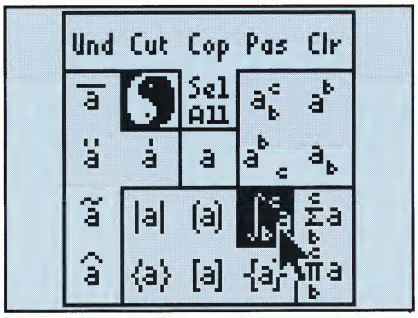
"... the Expressionist manual goes above and beyond excellence."
– MacGuide Magazine



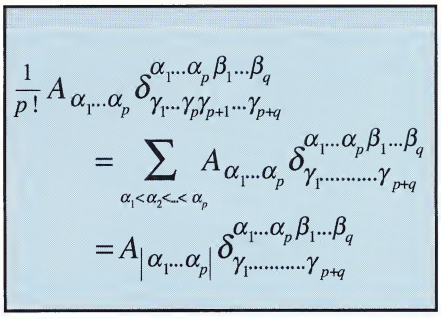
All mathematical structures and symbols are available from an editable palette. WYSIWYG equations are quickly and easily created and placed into your documents.



1 Select your Expressionist desk accessory while you are in your program, or use it as an application with MultiFinder.



2 Point and click on icon templates or use command key equivalents from the keyboard to create equations from the editable palette.



3 After your equation is finished, copy and paste it into your document. You can always re-edit any equation you have created.

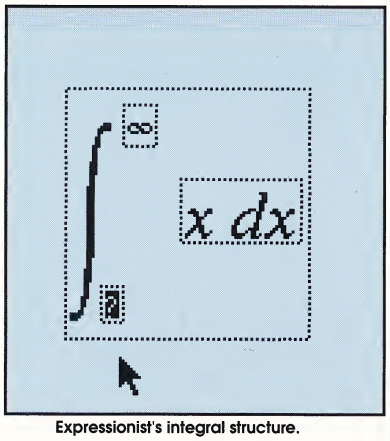
Prescience
Intuitive Tools For Mathematics

Equations Made Easy

Expressionist is a powerful application and desk accessory that enables mathematical equations to be quickly and easily placed into your word processor, page layout, or presentation documents. It is completely WYSIWYG and intuitive. There are no programming languages to learn or syntax errors to puzzle with!

Easy-To-Use Interface

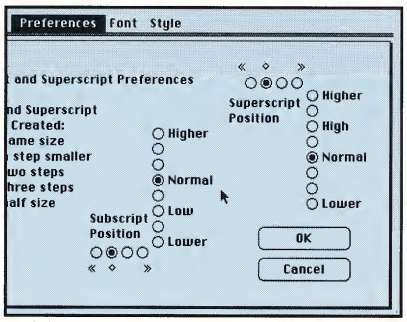
With Expressionist you can create equations immediately. Just click on an icon that represents a particular structure or symbol; for example, the integral. The integral structure will appear on your Expressionist scratchpad waiting for you to fill in the rest. Everything is already preformatted, spaced, and sized optimally for perfect equations. You can use any font, size, and style available from your system.



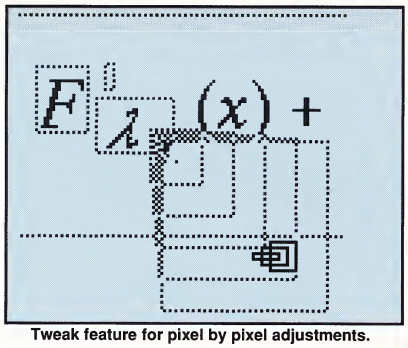
Expressionist's integral structure.

Complete And Customizable

All mathematical and Greek symbols are available to construct every type of equation imaginable. Expressionist may also be optimized to your working environment and professional discipline. For example, a Geologist will use different equations and symbols than a Cosmologist; however, both will use similar equation structures. The solution is to create macros of various equations, structures, and symbols and place them on the palette for easy access and frequent use. Expressionist's Preferences system enables you to personally control, by default, what style of integral and brackets you wish, where the sub-superscript should be placed, and more. For those of you who have mastered T_EX or other text-based equation typesetting systems, Expressionist can convert its equations into those familiar mark-up commands. Expressionist also can import and export equations to and from Theorist™, our symbolic algebra and graphing program. Expressionist will save you time, while producing better looking equations the way you want, for all of your reports, proposals, theses, and scientific work.



Subscript, superscript adjustable preferences.


Tweak feature for pixel by pixel adjustments.

Professional Features:

- Equation numbering structure
- Two-way programmable T_EX™ interface
- Optional integral styles
- Tweak feature for pixel-by-pixel adjustments
- Thin Space character for fine spacing adjustments
- Box enclosures
- Independent matrix column widths
- Guide and magnify modes for ease of editing
- On-line help
- Adjustable sub/superscripts
- Matrices up to 50 by 50 cells
- Spreadsheet-style matrix selection
- Hierarchical tree structure
- Overstrikes
- Special Tensor structure for General Relativity
- Adjustable structures through Preferences file
- Much more!

What Kind of Expressions Can I Make?

$-\infty \le \beta \le \infty$ Mathematical symbols

vertical and diagonal fractions $\dfrac{1}{(1\text{-}x^7)^{3/7}}$

$\sqrt[6]{\sqrt[5]{\sqrt[4]{\sqrt[3]{\sqrt{J}}}}}$ square and other roots

parentheses, etc. (e^{-x}) $\langle e^{-x} \rangle$ $|e^{-x}|$ $\left| e^{-x} \right\rangle$

$x^{e^{-x}}$ superscripts and subscripts $x_{e^{-x}}$

marks over any expression $\widehat{e^{-x}}$ $\dot{e}^{-x}$ $\overleftrightarrow{e^{-x}}$ $\overrightarrow{e^{-x}}$

various integral styles, and matrices of any size

$$\iint_C \frac{e^{-r \cdot r}}{2}\, dr \qquad \int_0^\infty \sin x \, dx \qquad \begin{vmatrix} x_{11} & \cdots & x_{1m} \\ \vdots & \ddots & \vdots \\ x_{n1} & \cdots & x_{nm} \end{vmatrix}$$

... and much more!

System Requirements:
512K of RAM
Mac 512kE, Plus, SE, SE/30
Mac II, IIcx, IIx, IIci, IIfx, Portable

Educational Discounts:
To qualify, Call Edutech at (408) 372-8126

Price: $129.95

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San Francisco, CA 94103
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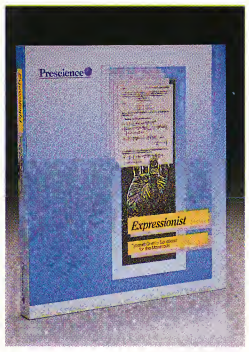


MATHEMATICS

Theorist

A young whiz kid deposes Mathematica to reign as the new king of math programs.

$e^{2\pi i}$ Anyone who was excited by the introduction of Wolfram Research's Mathematica two years ago should be bowled over by Theorist, an elegant new equation-manipulation program from Prescience. Using click-and-drag equation manipulation, 3-D color graphics, and animation, Theorist surpasses Mathematica in ease of use; practical functionality; and, in some cases, accuracy.

You can use Theorist with imaginary numbers, differential and integral calculus, and matrix algebra (along with other branches of math) in three ways: to solve and manipulate equations; as a tool for visualizing your equations and theories through graphs and animation; and as an educational tool for presenting math and science concepts. In each case, the interface is straightforward, with a variety of options.

EXCELLENT EQUATIONS You can enter equations by typing, using the tool palette, or employing a combination of both. On-screen, equations — consisting of symbols, superscripts, and subscripts — look exactly as they did for the 300 years before the advent of the computer. (Computer-science devotees can also display their equations in a FORTRAN-ish format by selecting that option.) Theorist also aids equation entry by automatically adding punctuation.

A solution to a problem in Theorist can be a numerical answer, a class of equations, or a graph. With Theorist, the equation-derivation process is clean and pure, requiring no programming. Simplifying expressions involves a single menu command.

The powerful click-and-drag manipulations are deceptively simple. For instance, to solve for *x*, merely select *x* and while holding down the Option key, drag to the symbol preceding the equation. To perform a substitution, do an Option-drag of a phrase to the variable in another equation. Option-drag also works with moving expressions to the other side of equations.

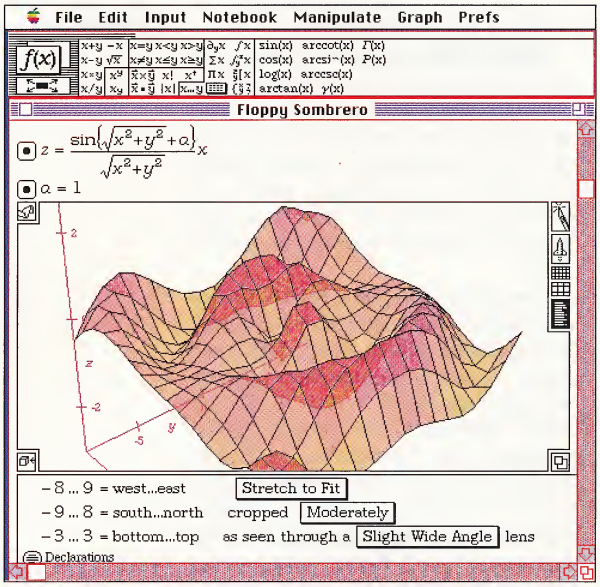
These manipulations are handy for solving simultaneous equations in multiple variables or for solving an equation such as *tan(x) = sin(2x)*, which has *x* on both sides. In Mathematica, this equation produces an error message followed by the empty set as a solution. Using Theorist's equation-manipulation tools, you get the first answer, which is $\pi/4$. You can also get a set of all solutions by turning on Auto Casing in the Prefs menu.

Menu versions of these operations are also available in the Manipulate menu. Other commands in this menu are Factor, Expand, Taylor Series, and Integration by Parts.

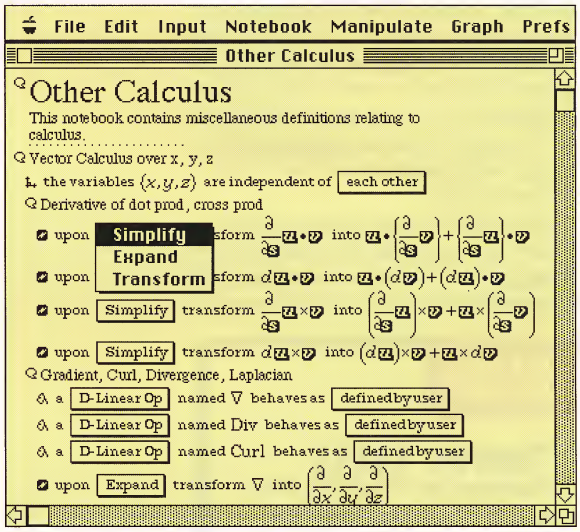
RULES OF THE GAME One of Theorist's most powerful aspects is the fact that it is not procedural. Definitions of math terms, rules, and transformations appear in one of several types of Propositions. These can be copied and pasted between files, and you can write your own.

One type of Proposition is the Name Declaration, represented by a flag icon, which defines terms as constants, variables, functions, or operands. The use of infinity (∞) in expressions is supported in the default declarations created with each new Theorist file, called a notebook.

Transformations are rules that act on terms in your equation. Creating them is simple: Type your function, select it, and pick Transform Rule from the Input menu. Using a pop-up menu, you can designate a transformation as one of three menu commands: Transform, Simplify, or Expand. When you use one of these commands on an expression, Theorist knows which rule to apply; you don't even have to know what the function is called.



Theorist is a math processor for real mathematicians — witness the familiar-looking equation at the top. The window below the graph can be used to change such aspects of the plot as the range of data plotted, the color scheme, and the degree of transparency.



Here's an example of different Propositions in one of Theorist's function notebooks. The user can assign the Simplify, Expand, or Transform commands from the Manipulate menu to this transformation. The flag icons indicate Name Declarations.

Theorist's special function Transformations come in separate notebooks. In comparison, Mathematica has a few more-sophisticated functions, such as additional Bessel functions, and has more automatic integration functions. However, one problem with Mathematica is that it loads everything in at once, resulting in 3 to 4 megabytes of code. With Theorist, you copy only what you need into a particular notebook file or add your own.

VISUAL MATH Plotting is a simple matter of choosing the form of a graph from the Graph menu, such as $y = f(x)$, $x = f(t)$, or $z = f(x,y)$. Theorist can plot in a variety of 2-D or 3-D coordinate systems, including Cartesian, logarithmic, polar, and cylindrical. Details of the plot can be altered in a pop-up window beneath the plot.

Theorist uses graphs to find the root of an equation: You zoom near the desired root and choose Find Root from the Graph menu. Although Mathematica's precision goes beyond Theorist's 19 decimal places, Theorist's root method is more accurate than Mathematica's purely numerical method. This is illustrated on page 3 of Stephen Wolfram's Mathematica book, in which an example asks to find the root of a Bessel function near 10.5. Mathematica's answer is 18.071, while Theorist returns two values that are closer: 11.792 and 14.931.

The graphics-manipulation tools are some of the best in any graphics program. If the graph displays an x-axis range of 0 to 10 but you want 20 to 30, just click and drag the plot to the left within the graph window. 3-D manipulation requires no special tool and is one of the easiest methods in any 3-D program; clicking on a 3-D graph yields the outline of a rectangle, which can be rotated in any direction by dragging.

Animation is equally simple. After you choose the graph and the variable to be changed, the Animate window from the Graph menu lets you specify the range of the variable, the number of frames, and the frames to be displayed per second. Animations can be saved for use later.

Theorist comes in two versions: one for the Mac Plus and SE, and the other for the SE/30 and the Mac II family that takes advantage of the math coprocessor. I tested both versions without problems. Theorist even ran on a 1-megabyte Mac Plus under MultiFinder, as long as 600K of RAM was available. Animations were slow on the Plus, but they did run. The well-organized manuals, with examples on almost every page, also get high marks.

THE BOTTOM LINE Besides having extensive features, Theorist is a well-thought-out, well-programmed application that does math the old-fashioned way: with real equations. I don't do a lot of math here at *MacUser*, but after seeing Theorist, I almost wish I did.

— John Rizzo

Get Info

Theorist ★★★★★
Published by: Prescience, 814 Castro St., San Francisco, CA 94114; (415) 282-5864.
Version: 1.01.
List Price: $379.95.